

REMARKS

With the entry of the present amendments, Claims 22-43 and 47-57 are pending in the application. Claim 47 has been amended. New claim 57 has been added. Support for the claim amendment and the new claim may be found in paragraph 0037 of the specification, as originally filed. In view of the following remarks, reconsideration and withdrawal of the rejections to the application in the Office Action is respectfully requested.

I. *Rejection of Claims 47-49 and 51 Under 35 U.S.C. § 102(b).*

Claims 47-49 and 51 were rejected under 35 U.S.C. § 102(e) as unpatentable over U.S. Patent Application Publication No. 2004/0023010, filed by Bulovic et al. (hereinafter “Bulovic”). In support of this rejection the Examiner asserts:

Bulovic discloses a phosphor material comprising domains (figure 1, 3) disposed on an organic film (4), each domain comprising luminescent semiconductor nanoparticles having a monodisperse size distribution (paragraphs 27-28, for example).

Applicants respectfully traverse.

To establish a *prima facie* case of anticipation, a cited reference must teach each and every limitation of the rejected claim. (MPEP 2131) Bulovic fails to teach each and every limitation of rejected Claim 47.

The Examiner relies on “first layer 3” in figure 1 of Bulovic as a disclosure of a phosphor material comprising domains. Applicants respectfully disagree with this characterization of the teachings of Bulovic. First layer 3 of Bulovic is described, in relevant part, as follows:

First layer 3 can include a plurality of semiconductor nanocrystals, for example, a substantially monodisperse population of nanocrystals. ... A layer that includes nanocrystals can be a monolayer of nanocrystals.

Thus, at best, of Bulovic teaches an organic layer (“second layer 4”) having a monolayer of nanocrystals disposed thereon. This amounts to the disclosure of an organic layer having a *single* domain of nanocrystals disposed thereon. Bulovic provides no teaching or suggestion that the monolayer of nanocrystals should be divided into a plurality of domains. To the contrary, Bulovic suggests that the monolayer should be made up of nanocrystals having a monodisperse size distribution. (See paragraph 0027.)

In contrast, Claim 47 specifically recites a phosphor material comprising a *plurality* of domains deposited on an organic film, *each domain comprising a plurality of luminescent semiconductor nanoparticles having a substantially monodisperse size distribution, and hence each domain capable of emitting a single color*. One example of what is possible with such a configuration is found in the instant application, paragraph 37 (italics added for emphasis):

“...For example, *domains of red-emitting* nanoparticles, *domains of blue-emitting* nanoparticles, and *domains of green emitting* (sic) nanoparticles may be deposited atop an organic film.”

Therefore, Bulovic fails to teach each and every limitation of Claim 47. For this reason, Applicants respectfully request that the rejection of Claim 47, and of Claims 48-51, which depend therefrom, be withdrawn.

II. Rejection of Claims 22-26, 30-36, 38-40, and 52-56 Under 35 U.S.C. § 103(a).

Claims 22-26, 30-36, 38-40 and 52-56 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication No. 2003/0067265, filed by Srivastava (hereinafter “Srivastava”) in view U.S. Patent Application Publication No. 2005/0266697, filed by Korgel (hereinafter “Korgel”). Applicants respectfully traverse.

In order to establish a *prima facie* case of obviousness, three criteria must be met: (1) the cited references must provide some motivation to modify the reference teachings; (2) there must

be a reasonable expectation of success; and (3) the resulting combination must teach or suggest all of the limitations of the rejected claims. (MPEP 2142)

In support of the rejection of independent Claim 22, the Examiner asserts:

Korgel discloses a light-emitting device using silicon nanoparticles to emit white light (paragraph 141), for the purpose of having high efficiency (abstract).

Applicants respectfully note that, properly read in the context of the specification, paragraph 141 of Korgel describes the use of silicon nanoparticles in an *electroluminescent* white-light emitting device. This is made clear in paragraphs 140 and 142 which describe devices that include an emissive layer containing a distribution of silicon nanoparticles sandwiched between two electrodes, wherein running a current across the distribution of nanoparticles induces them to emit a voltage-tunable light. Thus, Korgel does not teach a photoluminescent white-light emitting device wherein a primary light, rather than a current, is used to induce the emission of a secondary light.

In contrast to Korgel, Claim 22 specifically recites a *photoluminescent* white light-emitting device wherein semiconductor nanoparticles absorb a primary light and emit a secondary light. Therefore, Korgel fails to teach each and every limitation of Claim 22. For this reason, Applicants respectfully request that the rejection of Claim 22, and of Claims 22-26, 30-36, 38-40 and 52-56, which depend therefrom, be withdrawn.

III. Rejection of Claims 27-29, 37, 41-43, and 50 Under 35 U.S.C. § 103(a).

Claims 27-29, 37, 41-43 and 50 were rejected under 35 U.S.C. § 103(a) as unpatentable over Srivastava in view of Korgel and various other secondary references. Applicants respectfully traverse.

Claims 27-29, 37, 41-43 and 50 each depend directly or indirectly from Claim 22. Thus, for all of the reasons discussed in Section II, above, with respect to Claim 22, Applicants

respectfully submit that Claims 27-29, 37, 41-43 and 50 are also in condition for allowance and respectfully request that this rejection be withdrawn.

With regard to Claim 27, Applicants further note that the Examiner has failed to establish a *prima facie* case of obviousness for at least one additional reason. Claim 27 was rejected as obvious over Srivastava in view of Korgel and further in view of U.S. Patent Application Publication No. 2003/0186023, filed by Isoda (hereinafter “Isoda”). In support of this rejection, the Examiner stated:

Isoda discloses the primary light source is an infrared light source ... It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the primary light source ... disclosed by Isoda in the light emitting device disclosed by Srivastava in view of Korgel ...

Applicants respectfully traverse.

Isoda is directed to stimulable activated bromide phosphors that absorb and store radiation and then release the stored energy in the form of a stimulated emission when the phosphor is exposed to a stimulating light, such as infrared rays. (See paragraph 0002.) As one of ordinary skill in the art would understand, the absorption, stimulation and emission properties of these phosphors would be very specific to their chemical composition, which is very different from the composition of the silicon nanocrystals described in Korgel. Thus, as one of ordinary skill in the art would understand, the teachings of Isoda with regard to stimulable activated bromide phosphors provide no information or insight into the absorption and emission properties of silicon nanocrystals. Therefore, the description of an infrared light source in the context of the Isoda disclosure is insufficient to provide a suggestion or motivation to use that light source in a luminescent device that includes the silicon nanoparticles described by Korgel. For this additional reason Applicants respectfully request that the rejection of Claim 27, and Claims 28 and 29 which depend therefrom, be withdrawn.

With regard to Claim 37, Applicants further note that the Examiner has failed to establish a *prima facie* case of obviousness for at least one additional reason. Claim 37 was rejected as obvious over Srivastava in view of Korgel and further in view of U.S. Patent Application Publication No. 2004/0105980, filed by Sudarshan (hereinafter “Sudarshan”). In support of this rejection the Examiner stated:

Sudarshan discloses a semiconductor core-shell structure wherein the core comprises Si and the shell comprises SiC, for the purpose of protecting the core.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the core comprising Si and the shell comprising SiC disclosed by Sudarshan in the light emitting device disclosed by Srivastava in view of Korgel, for the purpose of protecting the core.

Applicants respectfully traverse.

Sudarshan discloses core particles having a plurality of coatings. However, Applicants were unable to find any disclosure in Sudarshan suggesting that the coatings were provided “for the purpose of protecting the core,” as asserted by the Examiner. Instead, Sudarshan teaches particle cores that are coated for the purpose of providing the particles with multifunctional properties. (See, for example, paragraphs 0002, 0005 and 0010.) Although the multifunctional properties are generally described as including magnetic, optical, electrical, biological, lubrication and rheological properties (see, for example, paragraph 0002), very little information is provided about which specific core/coating combinations provide which multifunctional properties. The only luminescent particles disclosed in Sudarshan are gold and silver particles coated in a polymer matrix. (Paragraph 0059) Moreover, the only disclosure of coated silicon and germanium particles in Sudarshan relates to water, oil, polyethylene glycol or polymer-coated silicon and germanium particles that may be used to change the transparency of a medium. (Paragraph 0058) Although silicon and germanium particles are included in a long list of possible core particles (paragraph 0032) and silicon carbide is included in a long list of possible coatings (paragraph 0038), Sudarshan provides no suggestion or motivation to coat a

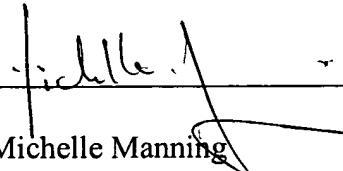
silicon or germanium particle with a silicon carbide coating to provide multifunctional properties. For this additional reason Applicants respectfully request that the rejection of Claim 37 be withdrawn.

In view of the foregoing remarks, Applicants respectfully submit that all of the claims remaining in the applications are in condition for allowance and favorable action thereon is respectfully solicited.

Respectfully submitted,

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FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (608) 258-4305
Facsimile: (608) 258-4258

By 
Michelle Manning
Attorney for Applicants
Registration No. 50,592